

DOCUMENT RESUME

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TITLE Mathematics Education Series (Summary of GEMTEP series--15 Modules).

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ABSTRACT

The inservice learning module described focuses on teaching mathematical concepts at the elementary grade level. Specifically covered in the module are discovery learning, drill activities, understanding number concepts, and introduction to geometry. Information is provided in this descriptive report on the scope and sequencing of topics and the activities and resources involved in using the module. A critique of the module and ordering information are included. (JD)

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DESCRIPTION OF TEACHER IN-SERVICE EDUCATION MATERIALS

A. SUMMARY INFORMATION

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

Title: MATHEMATICS EDUCATION SERIES (summary of GEMTEP series - 15 modules)

Publication Date(s): 1971-1973

Intended Users: Elementary school teachers who need additional knowledge about teaching mathematics

Grade Level(s): K-6

Number: Groups

Primary Focus: Mathematical operations and teaching concepts are highlighted.

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School subject(s) and/or in-service topic(s) covered:

There are 15 modules which cover the following topics: mathematical ideas, using the text, discovery approach, reading in math, drill activities, numeration, whole number concepts, fractions, adding and subtracting fractions, multiplying and dividing fractions, geometry, and measurement in the primary grades.

What participant does in using the materials:

Generally, the user 1) takes a pretest to determine which sections to study, 2) completes the module (mostly reading assignments and activities), 3) finishes the module with a posttest. All the modules are designed for individual use, but some can be adapted for group work. Many modules require teaching a lesson to a classroom of children.

Resources:

There are 15 modules, each a separate booklet ranging from 10-50 pages long. An instructor is needed for evaluation in each module. For many of the modules, a classroom of children is required. The module work takes from 1-15 hours, depending on the module.

Describer critique:

Most of the modules are refresher-type courses, or for the beginning teacher. The most interesting module is Teaching Reading in Mathematics, because the idea is seldom discussed in other approaches as thoroughly as it is in this one.

(ECE) - (TS) - (Ma) - drill activities - fractions - materials/
games/activities - geometry - measurement - number concepts -
primary math - problem solving - computational skills - whole/
rational numbers - number patterns 2

SP013 983

B. IN-DEPTH INFORMATION

Title: MATHEMATICS EDUCATION SERIES
Publication Date(s): 1971-1973
Intended Users: Elementary school teachers needing additional knowledge about teaching mathematics
Grade Level(s): K-6
Number: Groups
Primary Focus: Mathematical operations and teaching concepts are highlighted.

1.0 PURPOSES:

There seems to be three basic objectives of these modules:

1. To make the teacher aware of the various mathematic concepts and operations;
2. To give knowledge to the teacher about these concepts and operations; and
3. To prepare and help the teacher improve his/her mathematics program.

2.0 CONTENT — Scope and Sequencing of Topics:

Teaching Mathematical Ideas--introduction and module guide, sample test, reasons for beliefs, stating objectives, planning mathematical lessons, teaching assignment, references.

Using the Text--introduction, objectives, module guide, locations and sections of a teacher's edition, determining what a child should learn, determining goals and objectives for the students.

Teaching by Discovery--introduction, objectives, module guide, questionnaire, nature of learning by discovery, abstracting and generalizing, subverbal awareness, review, additional sample lessons, maxims for teaching by discovery, answer sheet, planning a discovery lesson.

Teaching Reading in Mathematics--introduction, objectives, module guide, rationale, using mathematics words, seeing and understanding symbols, relating objects, idea, words, and symbols, graphic materials, reading computation, understanding page organization, adapting reading rate, teaching reading in the math class.

Using Drill Activities--introduction, module guide, learning through drill, how and when to use drill, commercial materials, activities and games, performance evaluation.

Teaching Numeration in the Primary Grades--introduction, objectives, module guide, references, one-to-one correspondence, tally method, Hindu-Arabic numeration system, several numerals representing the same number, differences between numerals and numbers, place value, greater and less than, changes that occur when 1, 10, 100, 1000, etc., is added to a given number, decimal fractions.

Whole Number Concepts I: Learning Stages--objectives, introduction, module guide, major goals of teaching numeration to the early grades, Set A (matching, comparing, counting), Set B (deeper understanding), underlying organization of numbers, Set C (reading, writing, and using numerals), Set D (rational counting activities and basic understanding), helping students with problems, sample test, videotape report form, references.

Whole Number Concepts II: Teaching Procedures--introduction, guide, objectives, sample test, instructional materials for understanding counting and measuring, instructional materials for recognizing common teaching aids, material for counting, number-line, rods or bars, evaluation, references.

Teaching Concepts of Fractional Numbers--introduction, guide, unit, parts of a unit, number pair, fraction symbols, measurement, number-line, mixed numerals, improper fractions, equivalent fractions, less than, greater than, equal to, optional teaching assignment, appendix, bibliography.

Teaching Addition and Subtraction of Fractional Numbers--introduction, prerequisite checklist, fraction board, fraction regions, number-lines, like denominators, unlike denominators, equivalent fractions and least common denominators, properties of fractions, mixed numbers, uses of fractions, answer sheet, appendix.

Teaching Multiplication and Division of Fractional Numbers--introduction, guide, objectives, sample test, calculations, equations, word problems, multiplication inverse, repeated addition and subtraction, illustrations, step-by-step explanations, prerequisite skills, teaching fractions, references.

2.0 CONTENT — Scope and Sequencing of Topics: (Continued)

Geometry Module I: Content in Grades 1 Through 6--introduction, guide, basic terminology, angles, parallel and perpendicular lines, triangles, polygons, circles, 3-dimensional figures, perimeter, area, volume, symmetry, reflections, rotations, congruence, similarity, scale drawings, coordinates, graphs.

Geometry Module II: Activities for Grades 1 Through 6--introduction, guide, activities and games for symmetry, reflection, rotation, coordinates, circumference of a circle, area of a circle, area of a triangle, volume of rectangular prisms, constructions, properties of quadrilaterals, Pythagorean Theorem.

Teaching Measurement in the Primary Grades--introduction, guide, preliminary evaluation, definition of measurement, measurement in everyday life, comparisons, concept of measurement, uses of numbers and units, common units, standard units, readiness activities, value judgments, approximations, perimeter, area, use of a ruler, volume, and additional activities.

Problem Solving in Elementary Mathematics--not included in the package at the time of this reviewing.

3.0 ACTIVITIES AND RESOURCES INVOLVED IN USE OF PRODUCT

3.1 Description of main in-service activities:

Generally, the user (1) takes a pretest to determine the sections that need to be studied, (2) does the module (which is usually readings and some type of activity), and (3) finishes the module with a posttest. The module requirements vary and some require more work.

3.2 Help given in use of product:

Mathematics Education is a series of 15 modules; each has a separate booklet ranging from 10-50 pages.

4.0 EVALUATION OF TEACHER INSERVICE LEARNING

Usually a pre and posttest are required, but these must be designed by an instructor. Many of the modules have a sample test included.

Most of the modules also require the user to develop a lesson plan using the concepts taught.

5.0 ORDERING INFORMATION

5.1 Resources required/recommended:

An instructor is required for all the modules, especially for evaluation. All of the modules are designed for individual use, but some can be adapted for group work. Most of the materials can be adapted for older grades (secondary level). Many of the modules require teaching a lesson, so a classroom of children is needed. Access to math textbooks would be helpful. The work requires from 1-15 hours, depending on which module is used.

5.2 Distributor name/address:

UGA CBTEP Publications
427 Alderhold Hall
The University of Georgia
Athens, Georgia 30601
(404) 542-4194

5.3 Components/approximate costs: MATHEMATICS EDUCATION SERIES (15 modules) total: \$31.20

Component	Purchase	Rental	No. Req.	Reusable
1. Geometry Module I	\$1.80	--	1/participant	Yes
2. Geometry Module II	\$2.40	--	"	"
3. Teaching Mathematical Ideas	\$1.80	--	"	"
4. Teaching Concepts of Fractional Numbers	\$2.60	--	"	"
5. Teaching Addition and Subtraction of Fractional Numbers	\$3.00	--	"	"
6. Teaching Multiplication & Division of Fractional Numbers	\$2.40	--	"	"
7. Teaching Numeration in the Primary Grades	\$1.80	--	"	"
8. Using Drill Activities	\$1.80	--	"	"
9. Whole Number Concepts I	\$1.80	--	"	"
10. Whole Number Concepts II	\$1.80	--	"	"
11. Teaching by Discovery	\$1.80	--	"	"
12. Teaching Measurement in Primary Grades	\$2.80	--	"	"
13. Teaching Reading in Elementary Mathematics	\$1.80	--	"	"
14. Using the Text (not listed as a module)	\$1.80	--	"	"
15. Problem Solving in Elementary Math	\$1.80	--	"	"

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6.0 HISTORY OF DEVELOPMENT

6.1 Identification of the developer:

These modules were produced by the Atlanta Project Staff of the Department of Mathematics Education at the University of Georgia*. The developers are Mary Ann Byrne, Thomas J. Cooney, Edward J. Davis, Michael L. Mahaffey, William D. McKillip (director), and James W. Wilson.

*Referred to here as the GEMTEP (Georgia Elementary Mathematics Teacher Education Project) modules

6.2 How developed and when:

According to Mr. Thomas Cooney (currently Program Manager at RISE, National Science Foundation, Washington, D.C.) development took place in the early 70's. The modules were designed for inservice teachers. Informal field-testing was conducted with both preservice and inservice teachers.

6.3 Evidence of effectiveness with users:

Results of the field-testing were used to make revisions in the modules while they were being developed. No specific data is available showing what these test results were.

C. DESCRIBER CRITIQUE

Appropriateness / adaptability / technical quality:

The modules are appropriate for elementary school teachers who want an overview of math concepts and teaching ideas. Most of the materials can be adapted for secondary grades.

Content accuracy/social fairness/community acceptance issues:

The materials appear to be accurate. Most of the modules are well-thought-out.

There is no sex or racial bias, although some may be offended by the constant reference to the student as "he."

Overall summary/comment:

Most of the modules are refresher-type courses or are for the beginning teacher, but this is never stated in the modules. The most interesting module is teaching Reading in Mathematics, because this idea is seldom discussed as thoroughly in other approaches as it is here.